

## Formulas on the General Exam

This page contains all the formulas needed for the General class ham radio license exam. You might want to print out these formulas and review them just before entering the exam room, but leave this sheet in the car! *Do not bring it into the exam room with you!*

Standing wave ratio:

$$SWR = \frac{\text{highest-impedance}}{\text{lowest-impedance}}$$

Length of 1/2 wavelength antenna:

$$\text{Length (in feet)} = \frac{468}{\text{Frequency (in MHz)}}$$

Length of 1/4 wavelength antenna:

$$\text{Length (in feet)} = \frac{234}{\text{Frequency (in MHz)}}$$

International System of Units (SI):

$$1 \text{ nF} = 10^{-9} \text{ } \mu\text{F}$$

$$1 \text{ pF} = 10^{-12} \text{ nF}$$

Equal-value resistors in series:

$$R_t = \frac{R_i}{n}$$

Equal-value resistors in parallel:

$$R_t = \frac{R_i}{n}$$

Resistors in parallel:

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

Inductors in series:

$$L_t = L_1 + L_2$$

Equal-value inductors in parallel:

$$L_t = \frac{L_i}{n}$$

Capacitors in parallel:

$$C_t = C_1 + C_2 + C_3$$

Equal-value capacitors in series:

$$C_t = \frac{C_i}{n}$$

Capacitors in series:

$$\frac{1}{C_t} = \frac{1}{C_1} + \frac{1}{C_2}$$

Transformers:

$$E_s = E_p \times \left( \frac{N_s}{N_p} \right)$$

$$\frac{N_p}{N_s} = \sqrt{\frac{Z_p}{Z_s}}$$

RMS voltage:

$$V_P = \frac{V_{RMS}}{0.707}$$

$$V_{PP} = V_P \times 2$$

$$V_{RMS} = V_P \times 0.707$$

Power:

$$P = E \times I$$

$$P = \frac{E^2}{R}$$

$$P = I^2 \times R$$

$$E = \sqrt{P \times R}$$

Peak envelope power:

$$V_P = \frac{V_{PP}}{2}$$

$$V_{RMS} = V_P \times 0.707$$

$$PEP = \frac{V_{RMS}^2}{R}$$

Decibel math:

$$\text{loss-factor} = 10^{\left( \frac{-\text{loss-in-dB}}{10} \right)}$$

$$\text{percent-loss} = (1 - \text{loss-factor}) \times 100\%$$

Frequency modulation:

$$\text{bandwidth} = 2 \times (D_{MAX} + M_{MAX})$$

Upconverter:

$$\text{multiplier} = \frac{\text{transmitted-frequency}}{\text{lower-frequency}}$$

$$\text{lower-frequency-maximum-deviation} = \frac{\text{transmitted-frequency-maximum-deviation}}{\text{multiplier}}$$

International System of Units (SI)

Prefix	Symbol	Value		
giga-	G	10 <sup>9</sup>	1,000,000,000	one billion
mega-	M	10 <sup>6</sup>	1,000,000	one million
kilo-	k	10 <sup>3</sup>	1,000	one thousand
(none)	(none)	10 <sup>0</sup>	1	one
centi-	c	10 <sup>-2</sup>	.01	one one-hundredth
milli-	m	10 <sup>-3</sup>	.001	one one-thousandth
micro-	μ	10 <sup>-6</sup>	.000001	one one-millionth
nano-	n	10 <sup>-9</sup>	.000000001	one one-billionth
pico-	p	10 <sup>-12</sup>	.000000000001	one one-trillionth